

3/21/2006 Response to Office Action  
U.S.S.N. 10/164,916

Page 6

#### REMARKS

Claims 1, 2, 8-13 and 23-26 are pending. Claims 14-22 have been withdrawn from consideration. Claims 1, 2, 8-13 and 23-26 are currently rejected. The amendments and remarks provided below should place this application in condition for allowance.

Claims 1, 2, 8-13 and 23-26 are rejected under 35 U.S.C. §112, first paragraph as allegedly failing to comply with the written description requirement. The Office Action states that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

The applicants respectfully disagree. Applicants amended claims 1 and 2 in the previous response to keep the nomenclature in the claims consistent with that discussed in the specification. The following is an excerpt from the original specification at paragraph [0015]. *The term "polishing composition" refers to a composition or solution that does not include abrasive materials. Polishing compositions can be combined with a polishing pad, with or without an abrasive, to polish substrates. Alternatively, polishing compositions can be combined with a particulate abrasive to form a polishing (CMP) "slurry."* The term "slurry", therefore, is correctly used as defined in the specification, because claims 1 and 2 include the term "at least one abrasive" as part of the slurry. No new matter was introduced by this amendment as evidenced by the above excerpt. With this previous amendment providing a consistent use of the defined terms, one of skill in the art would clearly understand that the inventors were in possession of the claimed invention at the time the application was filed. Applicants respectfully request that the rejection under 35 U.S.C. §112 first paragraph, be withdrawn.

Claim 26 is rejected under 35 U.S.C. §112, second paragraph as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. The Office Action states that the limitation "polishing composition" lacks antecedent basis. Applicants have herein amended claim 26 to recite "polishing slurry", which has antecedent basis in claim 2.

Cabot Microelectronics Corporation  
870 North Commons Drive  
Aurora, IL, 60504  
Tel. (630) 375-5465

3/21/2006 Response to Office Action  
U.S.S.N. 10/164,916

Page 7

Claims 1, 2, 8-13 and 23-26 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Allman et al. (US 6,541,383). The Office Action states that Allman et al. teach that the adherence promoting ligand (a) may be applied to a polishing pad, and (b) may include a solution comprising at least one functionalized alkylsilane in solution. Additionally, the Office Action states that the abrasive particles may be moved in contact with a polishing pad. The Office Action further states that Allman et al. fails to teach applying the slurry directly to the polishing pad. The Office Action further states that it would have been obvious to one skilled in the art that during the CMP process the alkylsilane and abrasive are sandwiched between the polishing pad and the substrate and performing the same polishing function. The Office Action further quotes *In re Tatincloux* USPQ 125, "(t)he performance of two steps simultaneously which have previously been performed in sequence was held to have been obvious."

The applicants respectfully disagree. The arrangement taught by Allman et al. is one where a ligand is bonded on the planarizing surface (pad) followed by binding of an abrasive particle to the ligand. The motivation of Allman is to avoid the reliance of fluid dynamics to advance abrasion particles under the semiconductor wafer (column 8, lines 19-21) and to minimize the volume of slurry used (Column 8, lines 45-57). The process steps taught by Allman are to first adhere the abrasive to the polishing pad by means of a bound ligand and then to polish a substrate. The present invention does not involve a step of binding the abrasive to the polishing pad. Therefore, the citation to *In re Tatincloux* USPQ 125 is irrelevant, as the steps performed by the Allman patent are not performed in the present invention, sequentially or otherwise. The polishing of the substrate described in the present invention is done with an alkylsilane in solution, in contrast to the Allman patent wherein it is chemically bound to both the polishing pad and abrasive. The present invention describes the criticality of an alkylsilane being in solution during the polishing with one of the benefits being a reduction of surface defects (see original specification at paragraphs [0028] - [0029] and Example 1). The Allman patent, on the other hand, describes the criticality of the alkylsilane (adherence promoting ligand) being chemically bound to polishing pad (column 6, lines 52-61). The alkylsilane in Allman et al. is not chemically reactive to the substrate. Therefore, the polishing is achieved by very different mechanisms in these two inventions.

Cabot Microelectronics Corporation  
870 North Commons Drive  
Aurora, IL, 60504  
Tel. (630) 375-5465

3/21/2006 Response to Office Action  
U.S.S.N. 10/164,916

Page 8

The teachings of the Allman patent would not be obvious to one of ordinary skill in the art as it teaches away from the present invention.

The Office Action further states that Allman et al. fails to specify well known features (such as solution in claims 24 and 25 of the present application) to the art of semiconductor device fabrication and using various compositions (claim 26). The Office Action asserts that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to modify Allman et al. by performing routine experiments to obtain optimal results and adding any of the same well known features in order to efficiently perform the polishing operation with reasonable expectation of success. The Office Action also notes that the applicants did not traverse the stated conventionality (e.g. well known features and common knowledge).

The applicants respectfully disagree. Applicants previously asserted that the teachings of Allman et al. do not provide motivation, suggestion or incentive to arrive at the claimed instant invention of a method of polishing a substrate feature by applying a slurry comprising at least one functionalized alkylsilane, or at least one silane, in solution, and at least one metal oxide abrasive. The arrangement taught by Allman is one where a ligand is bonded on the planarizing surface (pad) followed by binding of an abrasive particle. The motivation of Allman is to avoid the reliance of fluid dynamics to advance abrasion particles under the semiconductor wafer (column 8, lines 19-21). Therefore, performing routine experimentation of the present invention to modify the type of solvent (claims 24 and 25) and the concentration of the silane in solution (claim 26) would have destroyed the intended function of the Allman invention (forming a chemically bound abrasive on the polishing pad). A person having ordinary skill in the art could not have found it obvious to modify Allman et al. by adding any of the same well known features in order to efficiently perform the polishing operation with reasonable expectation of success without the prior knowledge of the applicants' invention. For at least these reasons, applicants respectfully request that the obviousness rejection over Allman et al. (US 6,541,383) be withdrawn.

Claims 1, 2, 8-13 and 23-26 are rejected under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent No. 5,861,055 to Allman et al. (hereinafter the '055 Allman patent). The Office Action states that the '055 Allman patent teaches a polishing composition may be applied to a polishing substrate. The Office Action states that the '055 Allman patent teaches

Cabot Microelectronics Corporation  
870 North Commons Drive  
Aurora, IL, 60504  
Tel. (630) 375-5465

3/21/2006 Response to Office Action  
U.S.S.N. 10/164,916

Page 9

that the polishing composition may comprise at least one functionalized alkylsilane in solution, and at least one abrasive. The Office Action further states that because the prior art is used for polishing and planarizing the surface of semiconductors, therefore, moving the substrate into contact with a polishing pad such that the substrate surface feature contacts the polishing pad is expected to one skilled in the art of CMP. The Office Action additionally states that the instant invention differs from the '055 Allman patent by specifying applying slurry to the polishing pad rather than applying alkylsilane and abrasive to the substrate. The Office Action argues that it would have been obvious to one with ordinary skill in the art that during the chemical mechanical polishing process, the alkylsilane and the abrasive are sandwiched between the polishing pad and the substrate and perform the same polishing function.

The applicants respectfully disagree. The '055 Allman patent teaches a concentrated slurry designed to be applied to the substrate with the purpose of forming a temporary film. Furthermore, this film (alkylsilane) containing abrasive is dissolvable in a subsequently applied polishing wash, whereby the polishing media particle is freed to polish the target substrate (see '055 Allman column 2, lines 29-32). The '055 Allman patent, however, does not describe the contents of the subsequently applied polishing wash. Therefore, it is not known what composition is actually sandwiched between the polishing pad and the substrate, and performing the polishing function. Furthermore, as to the features in the dependent claims cited in the Office Action (page 5), a person having ordinary skill in the art could not have found it obvious to modify the '055 Allman patent by adding any of the same well known features in order to efficiently perform the polishing operation with reasonable expectation of success without the prior knowledge of the applicants' invention. For at least the reasons stated above, the applicants respectfully request that the rejections under 35 U.S.C. §103(a) be withdrawn with respect to the '055 Allman patent.

Cabot Microelectronics Corporation  
870 North Commons Drive  
Aurora, IL, 60504  
Tel. (630) 375-5465

3/21/2006 Response to Office Action  
U.S.S.N. 10/164,916

Page 10

This application is believed to be in good and proper condition for allowance. The applicants respectfully request the Examiner to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned at the number listed.

Respectfully submitted,

By Thomas Omholt

Thomas Omholt  
Reg. No. 37,052  
(630) 375-2033

Cabot Microelectronics Corporation  
870 North Commons Drive  
Aurora, IL, 60504  
Tel. (630) 375-5465